

JLOTS R&D SYMPOSIUM V

ENHANCED COASTAL

TRAFFICABILITY

AND SEA STATE MITIGATION- ATD

CROSS BEACH STABILIZATION

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SOFT SOIL TRAFFICABILITY

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OUTLINE

➔ PROBLEM

▢ CROSS BEACH

- EXISTING SOLUTIONS
- POTENTIAL SOLUTIONS

▢ SOFT SOIL

- OBJECTIVE
- STUDY AND RESULTS

▢ SUMMARY



PROBLEM

Loose Sand

MUD



SOFT SOIL TRAFFICABILITY - LOTS ATD



Sand-Grid



POTENTIAL TECHNOLOGIES

Plastic Hex Mat



PLACEMENT RATE

900 SQ FT / MAN HR vs 250 SQ FT FOR AM-2

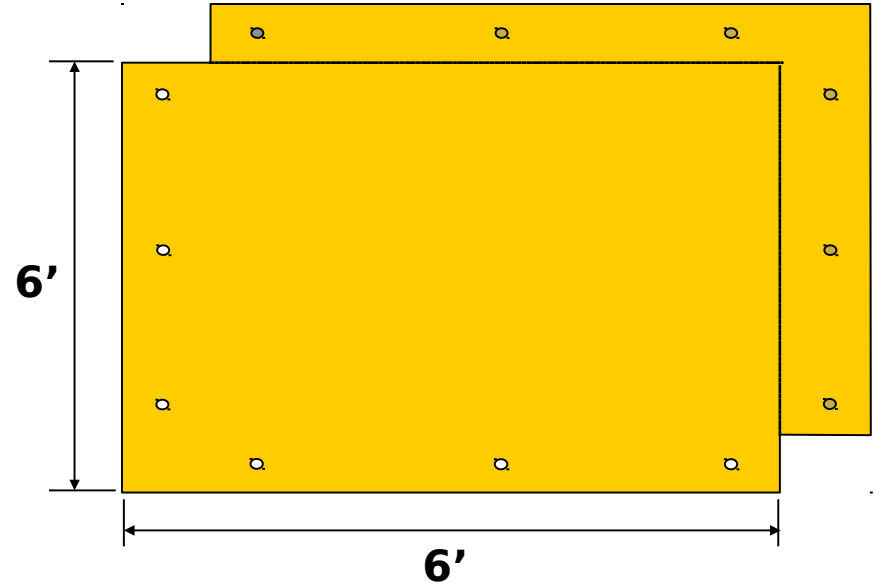


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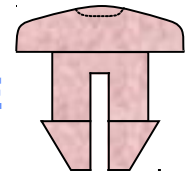
POTENTIAL TECHNOLOGIES

Fiberglass Mat



NEW SINGLE PANEL DESIGN

**6 POP-IN PINS
FLUSH SURFACE**



**THREE PANEL STANDARD MAT
12 BOLTS
NON FLUSH SURFACE**



POTENTIAL TECHNOLOGIES: **Mats**

Performance Under Traffic



ALUMINUM HEX MAT

1.1 IN. RUT AFTER 5000 PASSES



PLASTIC HEX MAT

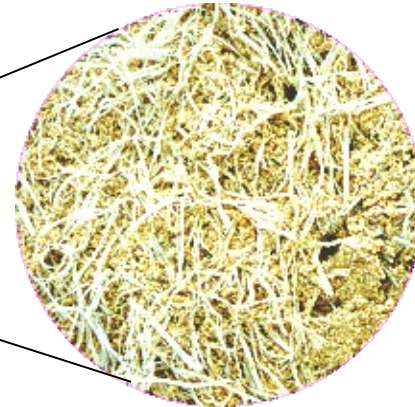
2.8 IN. RUT AFTER 5000 PASSES

FIBERGLASS MAT

1.8 IN. RUT AFTER 5000 PASSES



SAND - FIBER STABILIZATION



POTENTIAL TECHNOLOGIES: **Sand-Fiber**

Definition

▮ **Sand-Fiber** stabilization is a method of providing structural load-support improvement to sandy soils using synthetic fibers

▮ The improvement mechanism is increased the shear strength due to sand particle and fiber



CURRENT INVESTIGATION

Laboratory Tests

- Effect of fines on the Sand-Fiber mix
- Triaxial Test
- Unconfined Compressive Test
- Resilient Modulus Test



POTENTIAL TECHNOLOGIES: **Sand-Fiber** *Laboratory*

➔ **Test Conditions:**

- **2 Sand Types**
- **2 Fine Material Types**
- **3 Fiber Types**
- **Variable Fiber Contents (by Dry Weight of Material)**

▢ **Results Obtained:**

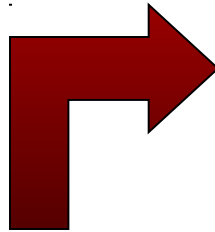
- **Effects Fine Content**
- **Effects of Moisture Content**
- **Repeatability of Test Results**



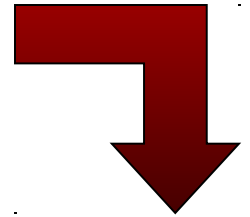
POTENTIAL TECHNOLOGIES: Sand-Fiber



MIXING



TEST SETUP



TYPICAL SAMPLE



COMPACTING



POTENTIAL TECHNOLOGIES: **Sand-Fiber**

Laboratory Major Findings

- ❑ Inclusion of fiber improved load bearing capacity
- ❑ Optimum fiber length of 2"
- ❑ Optimum fiber content lies between 0.6 to 1.0 % by dry weight
- ❑ Optimum moisture content of sample is beneficial but not essential



SOFT SOIL TRAFFICABILITY - LOTS ATD

OBJECTIVES - DEMONSTRATE NEW SOFT SOIL TRAFFICABILITY TECHNOLOGIES FOR LOTS
FOR WET SOILS WITH CBR < 0.5

**UNI-MAT OR PLASTIC-RUBBER MAT OVER
WOOD CHIPS OR SAND OVER
GEOGRID/GEOTEXTILE**

**FIBERGLASS MAT OVER STYROFOAM OVER
GEOGRID/GEOTEXTILE**

FOR WET SOILS WITH CBR 0.5 - 4.0

**UNI-MAT OR PLASTIC-RUBBER MAT OVER
GEOTEXTILE**

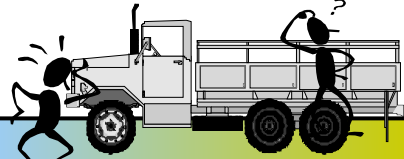
GRAVEL OVER GEOGRID/GEOTEXTILE

FIBERGLASS MAT OVER SAND/GEOTEXTILE



SOFT SOIL TRAFFICABILITY - LOTS ATD

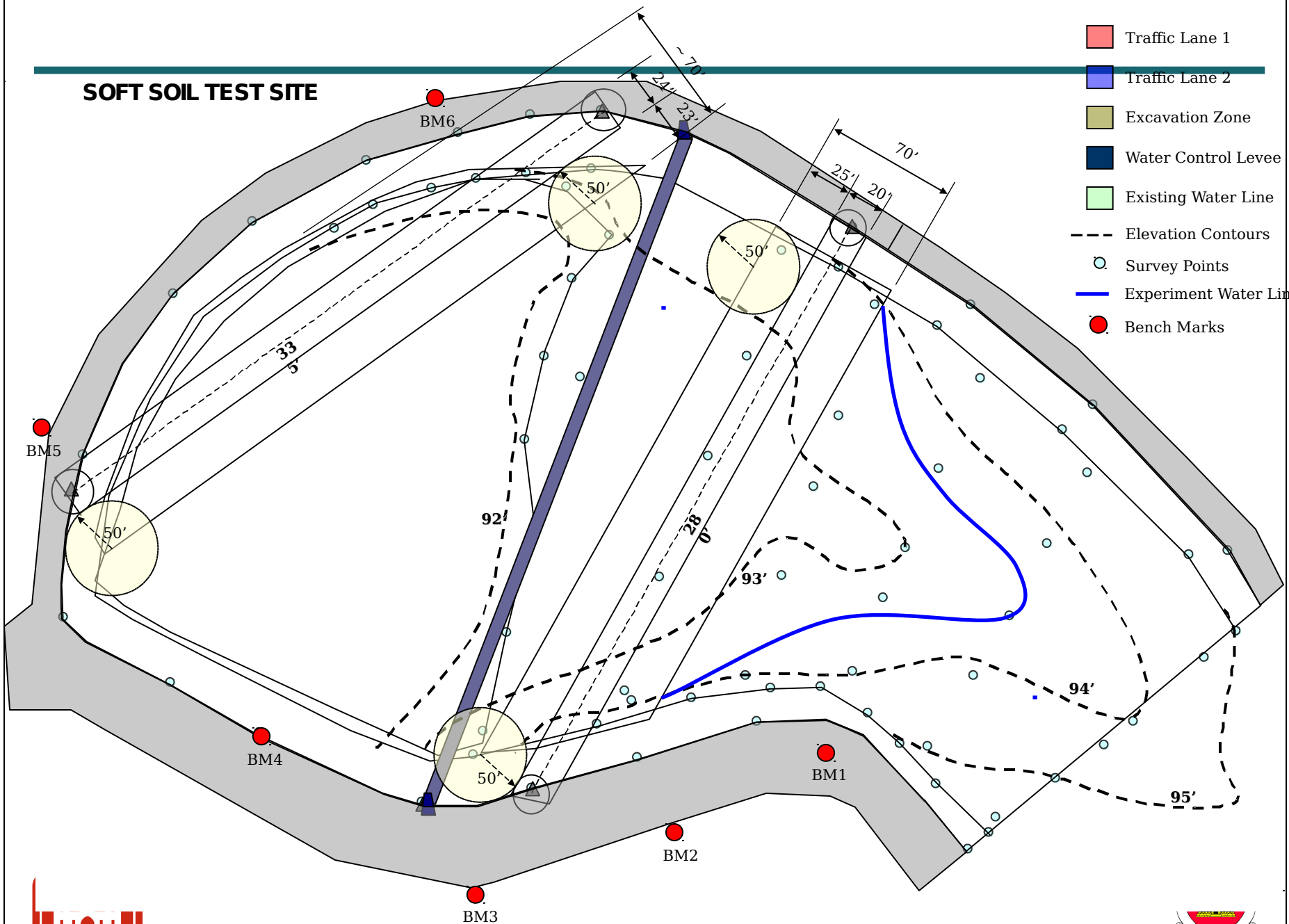
APPROACH - DEMONSTRATE NEW SOFT SOIL SOLUTIONS

EXISTING LOTS SOFT SOIL TRAFFICABILITY SYSTEMS	 < 0.5 CBR	
	0.5 - 4 CBR	
NEW LOTS SOFT SOIL SYSTEMS	None	None
	Encapsulated Foam/ Fiberglass Mat Uni-Mat/ Wood Chips/ Geotextile	Uni- Mat/Geotextile Gravel/Geogrid/ Geotextile Fiberglass Mat/ Sand-Fiber/ Geotextile

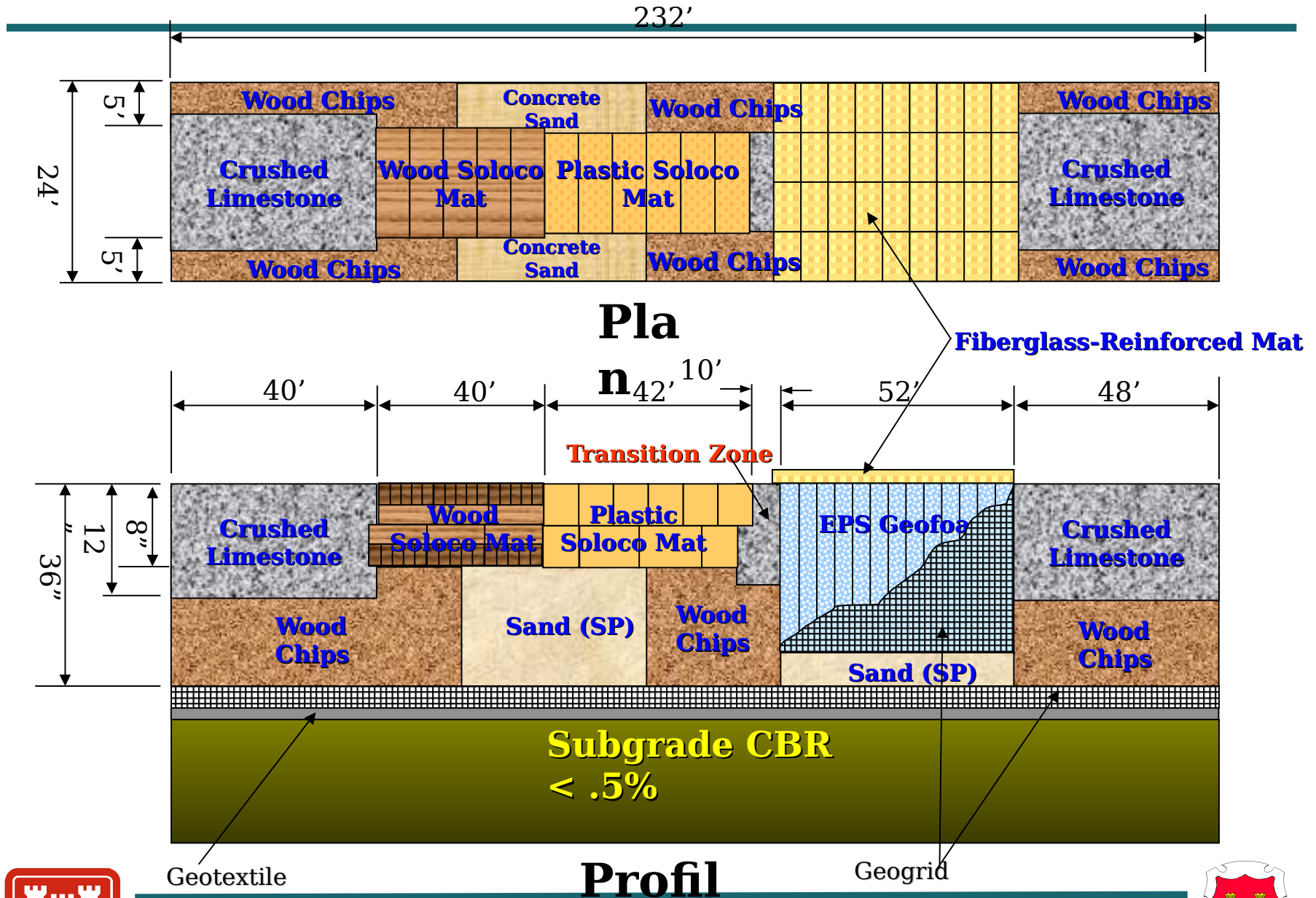


SOFT SOIL TEST SITE

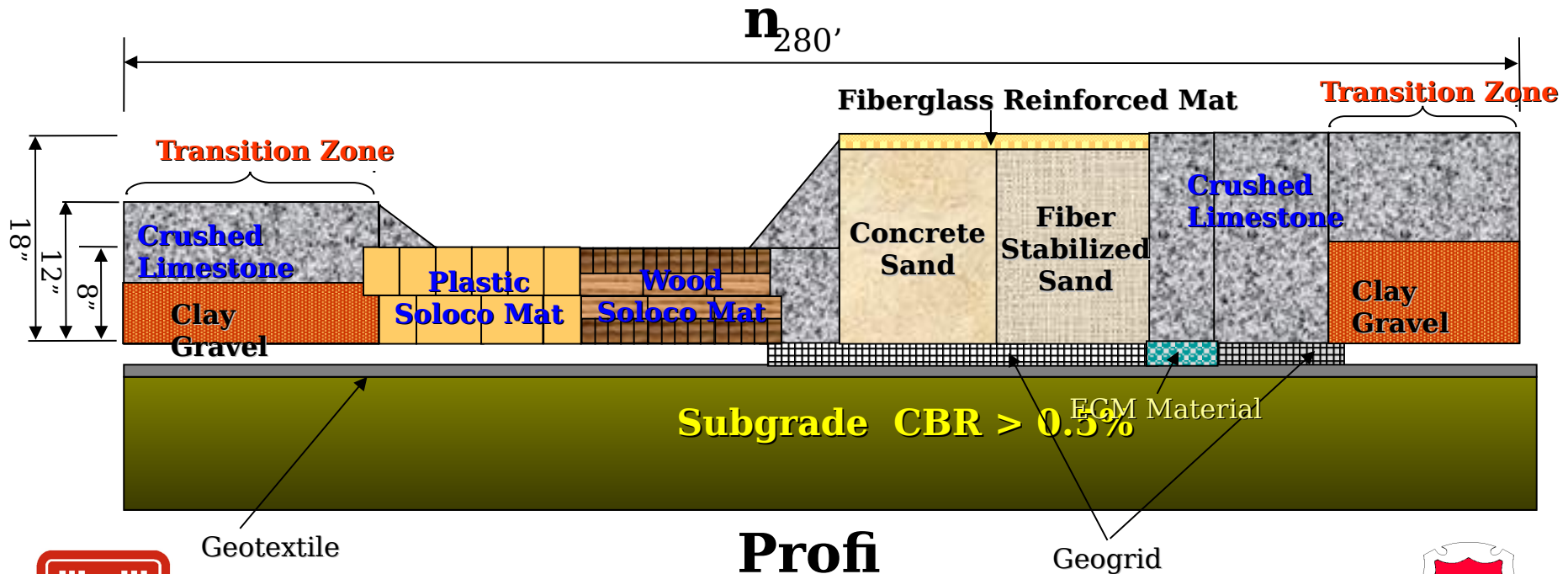
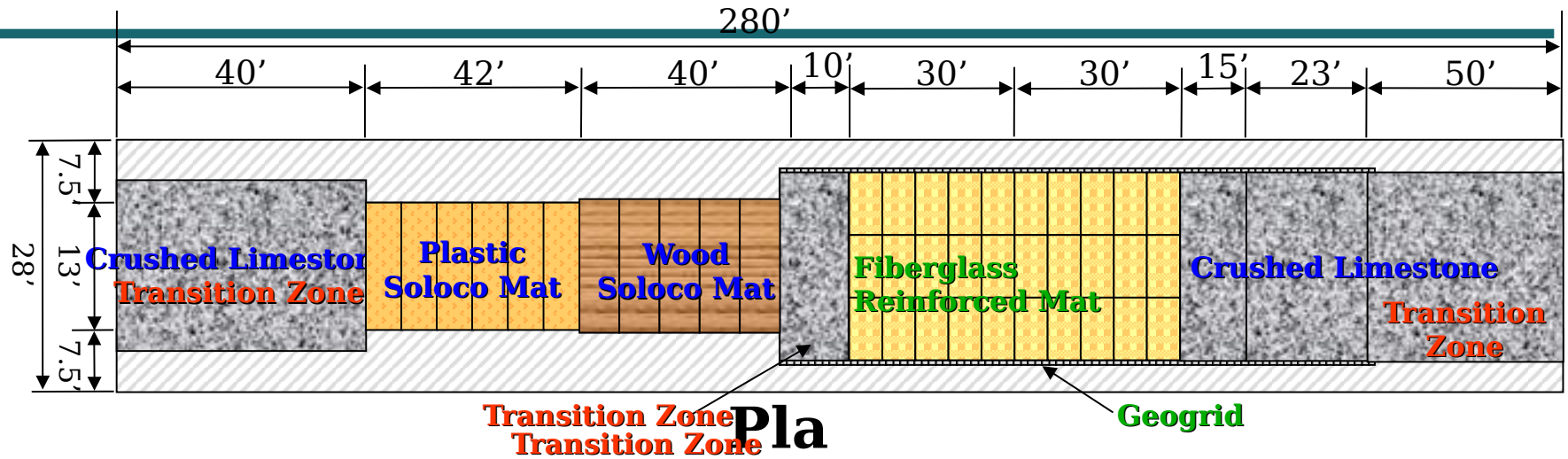
- Traffic Lane 1
- Traffic Lane 2
- Excavation Zone
- Water Control Levee
- Existing Water Line
- Elevation Contours
- Survey Points
- Experiment Water Line
- Bench Marks



Soft Soil Test Section - Lane 1



Soft Soil Test Section - Lane 2



SOFT SOIL TRAFFICABILITY



SITE CONSTRUCTION



SOFT SOIL TRAFFICABILITY



SITE CONSTRUCTION



SOFT SOIL TRAFFICABILITY

LANE 1
<0.5 CBR



SOFT SOIL TRAFFICABILITY

LANE 1
>0.5 CBR



A photograph of a green dump truck driving on a road. In the foreground, there is a large pile of gravel. The background shows trees and a utility pole.



SOFT SOIL TRAFFICABILITY



**RESULTS
LANE 1
<0.5 CBR**



Wood Chipper: Capacity - 75 tons/h



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Preliminary Traffic Findings

- **Greater than CBR 0.5%**

- **Plastic and Wooden Mat on Geotextile performed well**
- **Crushed Stone over Geogrid/Geotextile performed well**

- **Less than CBR 0.5%**

- **Wood chips over geotextile surfaced with gravel, plastic, or wooden mat performed well**
- **Geofoam blocks performed poorly**



SOFT SOIL TRAFFICABILITY - LOTS ATD

PRODUCTS

SOFT SOIL TRAFFICABILITY

DESIGN AND CONSTRUCTION GUIDANCE FOR:

- **Soft soil technologies
for CBR 0.5 - 4.0**
- **Soft soil technologies
for CBR < 0.5**



SOFT SOIL TRAFFICABILITY - LOTS ATD

SUMMARY

- **Three Potential Solutions for Cross**

- Beach Stabilization**

- Sand Fiber**

- Fiber Glass Mat**

- Plastic Hex Mat**

- **Soft Soil Composite Sections with Potential**

- Plastic Mat**

- Wood Chips**

- Uni-Mat**

